UNIVERSITI TEKNOLOGI MARA

GEOID DETERMINATION OVER NORTHERN REGION OF PENINSULAR MALAYSIA USING KTH METHOD

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Thesis submitted in fulfillment of the requirements for the degree of Surveying Science and Geomatics (Hons)

Faculty of Architecture, Planning & Surveying

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AUTHOR’S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Geoid modelling is a process of developing mathematical algorithms to represent the geoid. This is the reference surface for orthometric height. Thus, the needs of geoid model in a certain region is a necessary. In order to compute a high resolution of gravimetric geoid model, the quality of the input data is the highest priority. One of the input data is the Digital Elevation Model (DEM), where it takes part in the correct determination of topographical influence. On behalf of that, this study want to test the effect of different DEM model used in the geoid model computation by using the Least Square Modification of Stokes’ with Additive Corrections. In this research, the local geoid model for Northern region is computed from several database which include 5784 terrestrial gravity and 129098 marine gravity data points from Department of Surveying and Mapping (DSMM), the 1 arc second ALOS and SRTM GDEM and the combined global Geopotential model GO_CONS_GCF_2_DIR_R3. These models has been undergo evaluation and validation with the local mean GNSS/levelling indicated that orthometric height derived from ALOS and SRTM and GGM model GO_CONS_GCF_2_DIR_R3 fit well with the local heights and geoid model with RMSE of 3.048m, 3.652m and 0.26676m, respectively. For the missing gravity data in the study area, the surface gravity anomalies extracted from World Gravity Map 2012 is used. The new gravimetric geoid model has been developed in the Northern region using 1’x1’ arc minute grid interval with limit of latitude N4.75° to N7° and longitude E99.25° to E101.25°. The optimum method provides the best result using evaluation for new gravimetric geoid compared to 38 GNSS/Levelling points. The value of RMSE for the new geoid model for both GDEM used are 26cm and 9cm using absolute and relative methods respectively. Comparison with local geoid model derived using RCR method shows that NGM17 gives better presentation of the local gravimetric geoid model in the northern region of Peninsular Malaysia.
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